

## Age-related Changes in Tannin and nutrient Concentrations of *Casuarina equisetifolia* Plantations

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### Abstract

*Casuarina equisetifolia* is characterised by high primary productivity in coastal sandy soil which are generally low in fertility. High tannin production and nutrient resorption may be important strategies for *C. equisetifolia* in coastal environments. Despite the widespread planting and known ecological and physiological properties of *C. equisetifolia*, the information is scant about the nutrient resorption patterns and tannin concentrations in fine roots of *C. equisetifolia* plantations during stand development. Therefore, tannin and nutrient levels of *C. equisetifolia* at different developmental phases (juvenile, mature and senescent phases) were examined to discuss the different functions between fine roots and mature branchlets in Huian County, Fujian Province, China.

The results showed that *C. equisetifolia* branchlets contained relatively higher contents of total phenolics (TP), extractable condensed tannin (ECT), protein-bound condensed tannins (PBCT), total condensed tannin (TCT) and nutrients compared with those in fine roots. On the contrary, fiber-bound condensed tannins (FBCT) contents were higher in fine roots than in mature branchlets. Protein precipitation capacity (PPC) were higher for juvenile and mature plantations in mature branchlets than in fine roots, and lower for senescent plantations, while N:P ratios were just the opposite. Significant relationships were found between branchlets and fine roots for phosphorus, TP and TCT. In addition, the relationship between PPC and TP or TCT in branchlets, as well as PPC and TCT in fine roots were also significant. Our results indicated that tannin level and nutrient concentration were affected by stand age, and *C. equisetifolia* could adjust its secondary metabolism and nutrient level between above- and below-ground with stand development.